

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 28 March 2000 (28.03.00)	
International application No. PCT/SE99/01276	Applicant's or agent's file reference PCT 51070 cg
International filing date (day/month/year) 15 July 1999 (15.07.99)	Priority date (day/month/year) 31 July 1998 (31.07.98)
Applicant NELSON, Lennart et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

25 January 2000 (25.01.00)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Claudio Borton Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

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NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BERGLUND, Stefan
Bjerkéns Patentbyrå KB
Östermalmsgatan 58
S-114 50 Stockholm
SUÈDE

Date of mailing (day/month/year)

21 March 2001 (21.03.01)

Applicant's or agent's file reference

PCT 51070 cg

IMPORTANT NOTIFICATION

International application No.

PCT/SE99/01276

International filing date (day/month/year)

15 July 1999 (15.07.99)

1. The following indications appeared on record concerning:

☒

the applicant

☐

the inventor

☐

the agent

☐

the common representative

Name and Address

ALFA LAVAL AGRI AB
P.O. Box 39
S-147 21 Tumba
Sweden

State of Nationality

SE

State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒

the person

☒

the name

☐

the address

☐

the nationality

☐

the residence

Name and Address

DELAVAL HOLDING AB
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State of Nationality

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State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒

the receiving Office

☐

the designated Offices concerned

☐

the International Searching Authority

☒

the elected Offices concerned

☐

the International Preliminary Examining Authority

☐

other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

F. Baechler

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

REC'D 10 NOV 2000

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT 51070 sb/1t	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE99/01276	International filing date (day/month/year) 15.07.1999	Priority date (day/month/year) 31.07.1998
International Patent Classification (IPC) or national classification and IPC ₇ A 01 J 5/013		
Applicant Alfa Laval Agri Ab et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 25.01.2000	Date of completion of this report 02.11.2000
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Magnus Thorén/CF Telephone No. 08-782 25 00

Form PCT/IPEA/409 (cover sheet) (January 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01276

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed

☐ the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the claims:

pages _____, as originally filed

pages _____, as amended (together with any statement) under article 19

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the drawings:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01276

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-14</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-14</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-14</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The present invention^{o/} relates to a device for and a method of detecting a disease of the udder of an animal, and it comprises means for measuring milk flow from at least two teats of the udder and comparing these values and determining a deviation from a predetermined comparison value, which would indicate disease.

The cited US 5016569 reveals a method and device for detecting disease of a cow's udder by measuring the flow and milking time for each udder quarter and comparing these values with a predetermined value. A set deviation would indicate disease.

The cited Japanese abstract JP 5317343 teaches how to diagnose mastitis at an early stage by measuring the milk quantity for each teat, calculating the ratio of the this value with the value of the total milk quantity from the udder, and comparing this ratio with previous values.

The cited EP 0534564 shows a method where inter alia the milk flow or milk quantity from each teat on an udder is measured and compared to some set value thereby indicating an abnormality.

The present method differs in that it measures the milk flow from the teats and compares these values in pairs. Cf. claim 2 where the pair is either the forward pair or the rearward pair.

The invention is novel and not considered obvious to a person skilled in the art.

The invention is industrially applicable.

FOR THE PURPOSES OF INFORMATION ONLY

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DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

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A device for and a method of detecting a disease of the udder of an animal

BACKGROUND OF THE INVENTION AND PRIOR ART

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The present invention refers to a device for detecting a disease of the udder of an animal, comprising means for appreciating a parameter related to the quantity of milk extracted from a first teat and at least a second teat of said animal during at least one milking operation, means arranged to determine a deviation of said parameter of the first teat from a comparison value, and means arranged to display said deviation as an indication of an inflammation of the first teat in the case that said deviation exceeds a certain level. Moreover, the invention refers to a method of detecting a disease of the udder of an animal.

20

The present invention is concerned with udder inflammation of animals, i.e. mastitis, which may be caused by an infection of microorganisms, such as bacteria, but also be the result of a trauma or hormonal imbalances. In all milk production, mastitis constitutes a significant problem with respect to animal comfort, increased workload, reduced production capacity, etc.

25

In the past, different methods and devices have been proposed for identifying mastitis. Such methods and devices include, for instance, conductivity and temperature measurements on the milk extracted. Such measurements require a rather complicated equipment and the result thereof is still not very reliable. It is also known to identify mastitis by means of laboratory tests, which although reliable is rather inconvenient, since it might take many days before the result of such a test is received by the farmer.

30

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Furthermore, it is known that one part of the udder of a cow, i.e. a quarter of the udder, may be inflamed by mastitis whereas the other quarters thereof are still healthy. Consequently, it is
5 important to be able to identify any inflammation on an individual teat basis, i.e. for each quarter udder.

US-A-4 325 028 discloses one example of a device for measuring the conductivity of the milk from each individual teat in a milk
10 conduit between the teatcup and the claw in order to identify mastitis. The measurement equipment comprises a receiving device, provided in each such milk conduit and having electrodes located therein, and an electronic evaluation device. The constructions of the receiving devices are not described more
15 closely. The aim of the device disclosed is to enable the determination whether the conductivity value of the milk from an individual teat is abnormal and thus whether any udder part is inflamed.

20 EP-B-137 367 discloses a milking device comprising measurement equipment for detecting the milk flow from an individual teat. The value detected may be employed for determining when the milking from this teat is to be interrupted. The measurement equipment comprises two electrodes for each milk flow to be detected.

25 US-A-5 116 119 discloses an apparatus for measuring the milk flow through a flow channel. By means of electromagnetic radiation, the momentary volume and the momentary velocity of the milk flowing through the channel may be determined.
30 Consequently, it is possible to determine the milk quantity of each milking operation.

JP-A-5 317 343 discloses a device for diagnosing mastitis. The quantity of milk from each udder part of a cow is measured during
35 one milking operation. The relation between the milk quantity from each udder part and the total quantity is calculated. If the

calculated relation deviates from the previously calculated relation by at least a pre-set value it is determined that the udder part in question is suffering from mastitis.

5 SUMMARY OF THE INVENTION

The object of the present invention is to provide a device and a method for detecting a disease, in particular an inflammation, of an individual teat in a simple and reliable manner.

10

This object is obtained by the device initially defined and characterized in that the determining means is arranged to define said comparison value by including the level of said parameter regarding said second teat during the milking operation. It has
15 appeared that a deviation in the quantity of milk produced by a teat in relation to a normal quantity may indicate mastitis in the udder and the particular teat from which the milk has been extracted. Consequently, by making use of this knowledge it is possible to detect mastitis in an easy and convenient manner and thereby take
20 appropriate measures at an early stage to prevent the disease from infecting further udder parts or animals. It has been found that if the milk quantity of one udder part deviates from the milk quantity of an other udder part of one animal, there is high probability that the udder deviating is infected by mastitis. The
25 quantity of milk from one udder normally forms a certain percentage of the total milk quantity from the udder. Any deviation, especially reduction, of said percentage may indicate mastitis in the actual teat or udder part. Moreover, the first teat and said second teat may form one of a rearward pair of teats of the udder
30 or a forward pair of teats of the udder. The milk yield from corresponding udder parts, e.g. from the two rear udder parts, is normally essentially equal whereas the milk yield from the rear udder parts is normally greater than the milk yield from the forward udder parts. Trials have shown that the difference in milk yield
35 from a healthy udder part and an inflamed corresponding udder part might be 23%. By comparing corresponding udder parts in this

manner, no historical data regarding previous milking operations are necessary for the indication of mastitis. Moreover, normal variations in the milk yield need not be considered according to this embodiment. The comparison value may be based on one
5 single second teat or on two or three second teats, for instance, forming an average value of the remaining second teats.

According to a further embodiment of the present invention, said comparison value includes the level of said parameter of at least
10 one preceding milking operation of said animal. It is also possible to compare, for instance, the milk yield from different milking operations of one and the same teat or udder part. By collecting such historical data over a longer period of time, it is possible to determine a normal average parameter regarding the milk yield,
15 which then may be included in the comparison value. Preferably, the determining means is arranged to consider the time interval between the milking operation and the immediately preceding milking operation of said animal for determining said deviation. For instance, in voluntary milking systems, the time interval between
20 successive milking operations may vary. In order to obtain a comparable value of said parameter, it is advantageous to take account of this time interval.

According to a further embodiment of the present invention, said
25 parameter includes the quantity of milk produced during said milking operation and the appreciating means comprises a milk measuring device. In such a manner, a milk meter or any other liquid measuring device, such as any kind of liquid flow meter, may be employed for each teat or udder part for determining said
30 parameter.

According to a further embodiment of the present invention, said parameter includes the time duration of said milking operation and the appreciating means includes a time measuring device. It is
35 appreciated that the duration of the milking operation of one teat or udder part reflects the quantity of milk obtained during this milking

operation. Consequently, by comparing the time duration of, for instance, the milking operation of two corresponding udder parts or between two successive milking operations of one teat or udder part, it is possible in an easy and convenient manner to detect an inflammation of an udder part.

The above object is also obtained by the method initially defined and comprising the steps of:

appreciating a parameter related to the quantity of milk extracted from a first teat and at least a second teat of said animal during at least one milking operation,

defining a comparison value by including the level of said parameter regarding said second teat during said milking operation,

determining a deviation of said parameter of the first teat from said comparison value, and

indicating an inflammation of the first teat in the case that said deviation exceeds a certain level.

Advantageous embodiments of the method are defined in the dependent claims 9 to 14.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described more closely by means of various embodiments and with reference to the accompanying drawings, in which

Fig 1 shows a schematic view of a device according to the present invention, and

Fig 2 shows a part of a device according to the present invention.

DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS OF THE PRESENT INVENTION

Fig 1 discloses a device for indicating mastitis in any of the teats
5 or udder parts of an animal. The device according to the invention
is connected to a milking machine, which may be of a conventional
type and which is merely represented in the drawings by four
teatcups 1, 2, 3 and 4 and four milk conduits 5 connecting each
teatcup 1-4 to a milk-receiving member of the milking machine.

10

In the following it is referred to milking of a respective teat.
However, by this expression is meant milking of a respective udder
part, i.e. one of the two rear udder parts or one of the two front
udder parts. As an example, the teatcups 1, 4 may be intended for
15 milking of the front udder parts whereas the teatcups 2, 3 are
intended for milking of the rear udder parts.

The device comprises a processing unit 6 provided to determine a
deviation in a parameter related to the quantity of milk extracted
20 from any of the four teats from a comparison value. The
processing unit 6 is connected to or incorporates a display member
7. The display member 7 may be of a number of different types.
For instance a screen, a number of indicating lamps or diodes, one
for each teat, producing a light signal when a teat is inflamed, or
25 any display disclosing the size of the deviation leaving to the
farmer to conclude if the deviation indicates an inflammation or
not. Furthermore, the processing unit 6 may be connected to or
incorporate a time measuring unit 8 arranged to measure the
duration of a milking operation of a teat and/or the time period
30 between two successive milking operations of a teat.

Furthermore, the device according to the invention comprises
appreciating means 9, one for each teatcup 1-4. The construction
and function of the appreciating means 9 may vary according to
35 different embodiments of the present invention. Fig 2 discloses an
appreciating means 9 in the form of a milk measuring device

comprising a container 10 arranged to collect the milk produced during one milking operation. The milk measuring device comprises a sensor 11 arranged to sense the quantity of milk collected during the milking operation and transfer the sensed quantity to the processing unit 6. When the processing unit 6 has registered the milk quantity, a valve 12 is opened in order to convey the milk collected to the milk-receiving member of the milking machine. It is to be noted that also other types of milk measuring devices may be employed when realising the present invention, for instance the liquid measuring device disclosed in US-A-5 116 119.

The appreciating means 9 may also be realised by a device merely arranged to indicate whether there is a milk flow or not. Such a device is for instance disclosed in EP-B-137 367 mentioned above. Thereby the time measuring unit 8 may be arranged to measure the duration of the milking period, i.e. the time interval from the beginning of the milk flow through the conduit 5 until the end of the milk flow. It is appreciated that the duration of the milking operation reflects the quantity of milk produced during said milking operation, i.e. the interval appreciated forms said parameter.

According to an embodiment, the processing unit 6 is arranged to compare said parameter related to the quantity of milk from the two front teatcups 1, 4 or from the two rear teatcups 2, 3. In this case no time measuring unit 8 is necessary. Merely the fact that the quantity of milk from one of the front teats or the rear teats deviates from the other front teat and rear teat, respectively, is an indication that the actual teat may be inflamed by mastitis.

According to another embodiment, the processing unit 6 is arranged to compare said parameter between the actual milking operation and at least one previous milking operation. A deviation in quantity in the actual milking operation is an indication that the teat may be inflamed by mastitis. In this embodiment the processing unit 6 comprises a memory 13 arranged to store

historical data regarding said parameter of one or more previous milking operations for each teat. Preferably, an average value of said parameter of a great number of previous milking operations may be calculated by means of the processing unit 6. This average value may then be stored in the memory 13 and included in said comparison value.

It is to be noted that the comparison value is based on the parameter of another teat during one milking operation but historical data from one or several preceding milking operations may also be considered, as a supplementary information, when defining the comparison value in order to reduce any source of error.

It is also possible to define said parameter as the quantity of milk produced during a determined period of time by one teat of an animal, for instance during 24 hours, or by the total duration of milking during a determined period of time, i.e. the total time period when milk is actually flowing from a teat during 24 hours.

The present invention is not limited to the embodiments described above but may be varied and modified within the scope of the following claims.

Claims

1. A device for detecting a disease of the udder of an animal, comprising means (9) for appreciating a parameter related to the quantity of milk extracted from a first teat and at least a second teat of said animal during at least one milking operation, means (6) arranged to determine a deviation of said parameter of the first teat from a comparison value, and means (7) arranged to display said deviation as an indication of an inflammation of the first teat at least in the case that said deviation exceeds a certain level, characterized in that the determining means (6) is arranged to define said comparison value by including the level of said parameter regarding said second teat during said milking operation.
2. A device according to claim 1, characterized in that the first teat and said second teat form one of a rearward pair of teats of the udder or a forward pair of teats of the udder.
3. A device according to any one of the preceding claims, characterized in that said comparison value includes the level of said parameter of at least one preceding milking operation of said animal.
4. A device according to claim 3, characterized in that the determining means (6, 8) is arranged to consider the time interval between the milking operation and the immediately preceding milking operation of said animal for determining said deviation.
5. A device according to any one of the preceding claims, characterized in that said parameter includes the quantity of milk produced during said milking operation and that the appreciating means (9) includes a milk measuring device.
6. A device according to claim 5, characterized in that the milk measuring device (9) includes a flow meter.

7. A device according to any one of the preceding claims,
characterized in that said parameter includes the time duration of
said milking operation and that the appreciating means includes a
5 time measuring device (8).

8. A method of detecting a disease of the udder of an animal,
comprising the steps of:
appreciating a parameter related to the quantity of milk extracted
10 from a first teat and at least a second teat of said animal during at
least one milking operation,
defining a comparison value by the level of said parameter
regarding said second teat during said milking operation,
determining a deviation of said parameter of the first teat from said
15 comparison value, and
indicating an inflammation of the first teat at least in the case that
said deviation exceeds a certain level.

9. A method according to claim 8, comprising the further step
20 of:
displaying said deviation as an indication of an inflammation of the
first teat in the case that said deviation exceeds a certain level.

10. A method according to any of claim 8 and 9, wherein the first
25 said teat and said second teat form one of a rearward pair of teats
of the udder or a forward pair of teats of the udder.

11. A method according to any one of claims 8 to 10, wherein
said comparison value includes the level of said parameter of at
30 least one preceding milking operation of said animal.

12. A method according to claim 11, comprising the step of:
considering the time interval between said milking operation and
the nearest preceding milking operation of said animal when
35 determining said deviation.

13. A method according to any one of claims 8 to 12, wherein said appreciating step includes measuring the quantity of milk extracted from the actual teat during said milking operation.
- 5 14. A method according to any one of claims 8 to 13, wherein said appreciating step includes measuring the time duration of one milking operation of the actual teat.

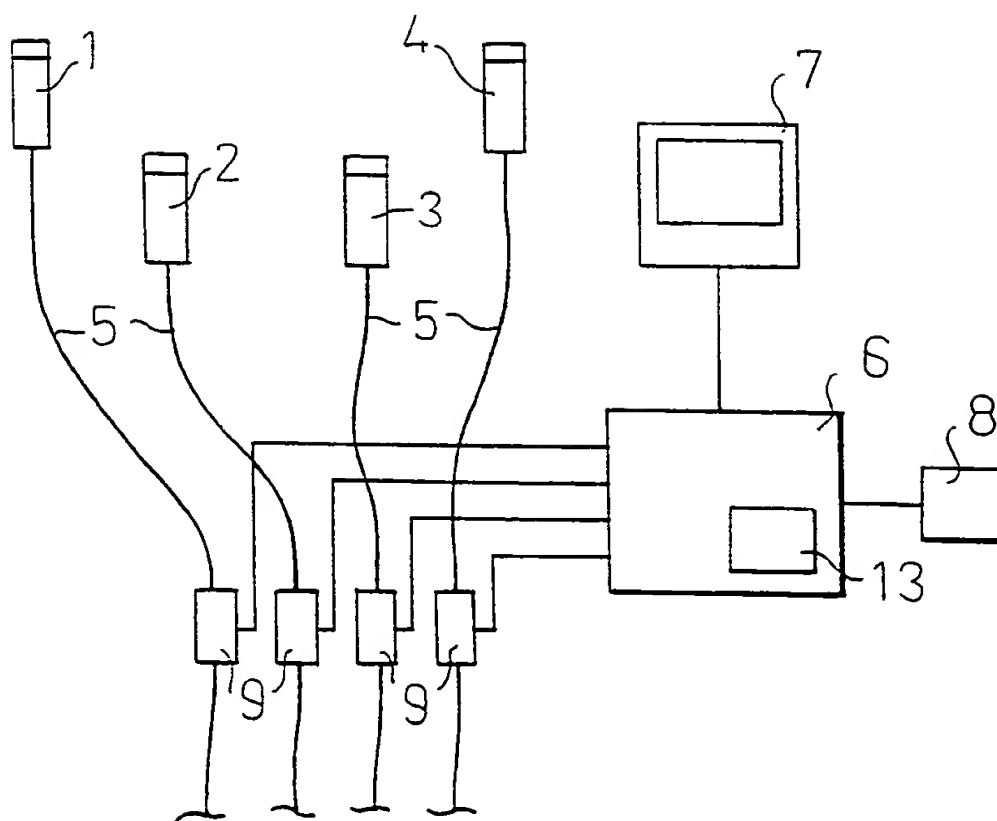
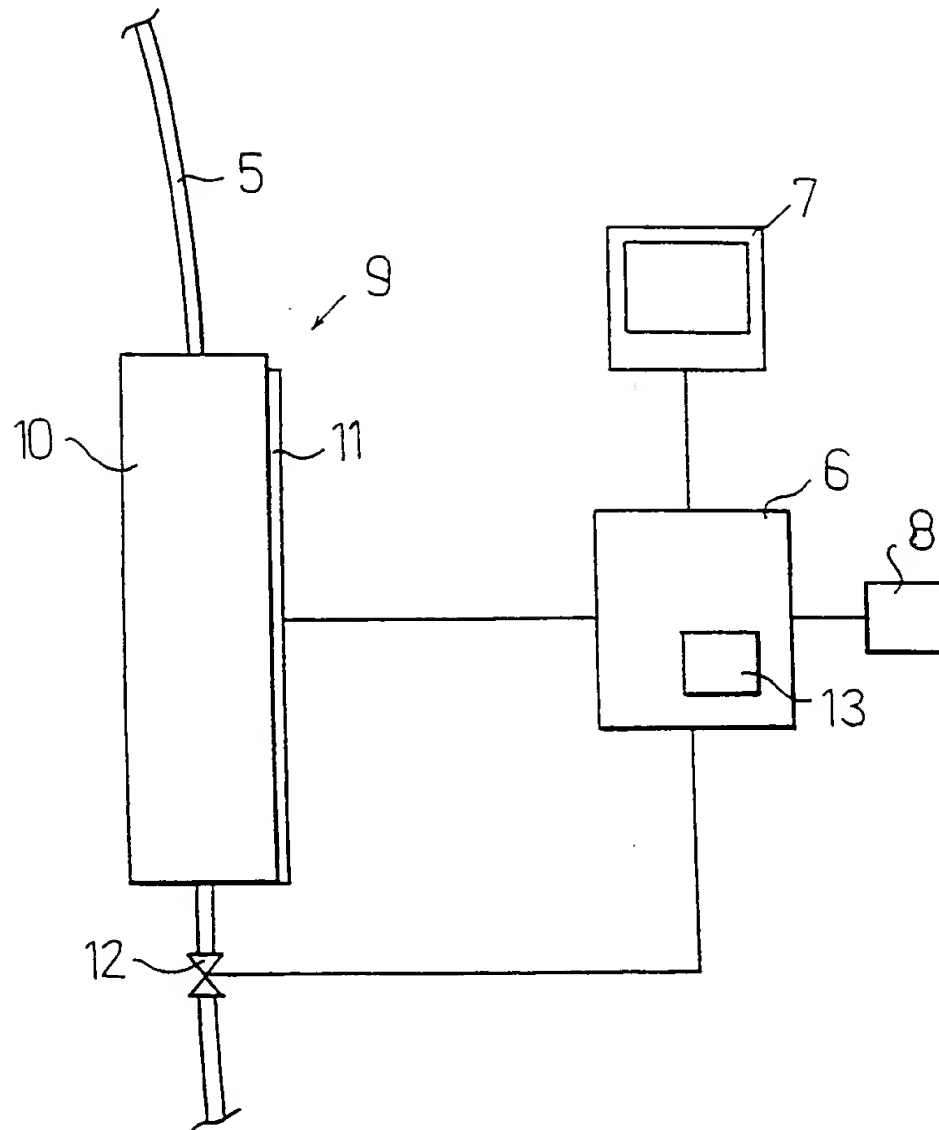
Fig 1

Fig 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01276

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A01J 5/013

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5016569 A (MOSKVIN), 21 May 1991 (21.05.91), column 1, line 12 - line 29 --	
A	Patent Abstracts of Japan, abstract of JP 5-317343 A (KUBOTA CORP), 3 December 1993 (03.12.93) --	
A	EP 0534564 A2 (C VAN DER LELY N.V.), 31 March 1993 (31.03.93), claims 21,34 --	
A	EP 0657098 A1 (N.V. NEDERLANDSCHE APPARATENFABRIEK NEDAP), 14 June 1995 (14.06.95) --	

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 October 1999

Date of mailing of the international search report

14 -12- 1999

Name and mailing address of the ISA:

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Magnus Thorén / JA A

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01276

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0385539 A2 (C. VAN DER LELY N.V.), 5 Sept 1990 (05.09.90) --	
A	US 4574736 A (TANAKA ET AL), 11 March 1986 (11.03.86) --	
A	US 4064838 A (MUKAROVSKY ET AL), 27 December 1977 (27.12.77), abstract -- -----	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE 99/01276

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5016569 A	21/05/91	BG 60042 A DE 58906447 D EP 0381762 A,B SU 1720600 A WO 8910686 A YU 91889 A	16/08/93 00/00/00 16/08/90 23/03/92 16/11/89 30/06/91
EP 0534564 A2	31/03/93	SE 0534564 T3 AT 163833 T AT 170704 T DE 4293408 T DE 9219130 U DE 69224692 D,T DE 69226918 D,T EP 0534565 A,B SE 0534565 T3 EP 0836802 A JP 6504204 T NL 9101636 A US 5568788 A US 5873323 A WO 9305647 A	15/03/98 15/09/98 07/03/96 16/04/98 27/08/98 18/03/99 31/03/93 22/04/98 19/05/94 16/04/93 29/10/96 23/02/99 01/04/93
EP 0657098 A1	14/06/95	NL 9302154 A	03/07/95

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/SE 99/01276

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0385539 A2	05/09/90	SE 0385539 T3	
		AT 106179 T	15/06/94
		AT 116519 T	15/01/95
		AT 116799 T	15/01/95
		AT 117504 T	15/02/95
		AT 128321 T	15/10/95
		DE 69009235 D,T	26/01/95
		DE 69015828 D,T	10/08/95
		DE 69016045 D,T	20/07/95
		DE 69016461 D,T	20/07/95
		DE 69022746 D,T	25/04/96
		DK 385539 T	26/09/94
		DK 510779 T	04/12/95
		DK 511722 T	27/03/95
		DK 516246 T	18/04/95
		EP 0510779 A,B	28/10/92
		SE 0510779 T3	
		EP 0511722 A,B	04/11/92
		SE 0511722 T3	
		EP 0511723 A,B	04/11/92
		SE 0511723 T3	
		EP 0516246 A,B	02/12/92
		SE 0516246 T3	
		EP 0584890 A	02/03/94
		NL 8900479 A	17/09/90
		NL 9900001 A	01/06/99
		NL 9900002 A	01/06/99
		NL 9900003 A	01/06/99
		US 5080040 A	14/01/92
		US 5195456 A	23/03/93
		US 5272997 A	28/12/93
		US 5275124 A	04/01/94

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/SE 99/01276

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4574736 A	11/03/86	AT 47645 T	15/11/89
		AU 564801 B	27/08/87
		AU 3322884 A	04/04/85
		CA 1228831 A	03/11/87
		DK 160342 B,C	04/03/91
		DK 456384 A	27/03/85
		EP 0137367 A,B	17/04/85
		SE 0137367 T3	
		FI 75084 B,C	29/01/88
		FI 843780 A	27/03/85
		JP 1403961 C	09/10/87
		JP 60070021 A	20/04/85
		JP 62010127 B	04/03/87
		NZ 209567 A	30/05/88
		SU 1526564 A	30/11/89
<hr/>			
US 4064838 A	27/12/77	AU 1339276 A	29/09/77
		BE 841220 A	16/08/76
		CH 608937 A	15/02/79
		CS 183854 B	31/07/78
		DD 123504 A	05/01/77
		DE 2618940 A,B	11/11/76
		DK 180676 A	30/10/76
		FR 2309134 A,B	26/11/76
		GB 1520605 A	09/08/78
		JP 51145774 A	14/12/76
		NZ 180723 A	08/06/79
		SE 406414 B	12/02/79
		SE 7604715 A	30/10/76
<hr/>			

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT 51070 sb/1t	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/SE99/01276	International filing date (<i>day/month/year</i>) 15.07.1999	Priority date (<i>day/month/year</i>) 31.07.1998
International Patent Classification (IPC) or national classification and IPC ₇ A 01 J 5/013		
Applicant Alfa Laval Agri Ab et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 25.01.2000	Date of completion of this report 02.11.2000
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Magnus Thorén/CF Telephone No. 08-782 25 00

Form PCT/IPEA/409 (cover sheet) (January 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01276

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☐ the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement) under article 19
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the drawings:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE99/01276

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-14</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-14</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-14</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The present invention^{o/} relates to a device for and a method of detecting a disease of the udder of an animal, and it comprises means for measuring milk flow from at least two teats of the udder and comparing these values and determining a deviation from a predetermined comparison value, which would indicate disease.

The cited US 5016569 reveals a method and device for detecting disease of a cow's udder by measuring the flow and milking time for each udder quarter and comparing these values with a predetermined value. A set deviation would indicate disease.

The cited Japanese abstract JP 5317343 teaches how to diagnose mastitis at an early stage by measuring the milk quantity for each teat, calculating the ratio of the this value with the value of the total milk quantity from the udder, and comparing this ratio with previous values.

The cited EP 0534564 shows a method where inter alia the milk flow or milk quantity from each teat on an udder is measured and compared to some set value thereby indicating an abnormality.

The present method differs in that it measures the milk flow from the teats and compares these values in pairs. Cf. claim 2 where the pair is either the forward pair or the rearward pair.

The invention is novel and not considered obvious to a person skilled in the art.

The invention is industrially applicable.

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ SE

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference PCT 51070 sb/lt	
International application No. PCT/SE99/01276	International filing date (day/month/year) 15/07/99 (Earliest) Priority date (day/month/year) 31/07/98
Title of invention "A device for and a method of detecting a disease of the udder of an animal"	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Alfa Laval Agri AB P.O. Box 39 SE-147 21 Tumba SWEDEN	
Telephone No.:	
Facsimile No.:	
Teleprinter No.:	
State (that is, country) of nationality: Sweden	State (that is, country) of residence: Sweden
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) NELSON, Lennart Sjöströmsvägen 2 SE-270 35 Blentarp SWEDEN	
State (that is, country) of nationality: Sweden	State (that is, country) of residence: Sweden
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) SJAUNJA, Lars, Ove Fibyvägen 3 SE-740 20 Vänge SWEDEN	
State (that is, country) of nationality: Sweden	State (that is, country) of residence: Sweden
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.	

Box No. III AGENT OR COMMON REPRESENTATIVE: OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*BJERKENS PATENTBYRÅ KB, represented by
BERGLUND, Stefan; BJERKEN, Håkan;
OLSSON, Jan or ISRAELSSON, StefanÖstermalmsgatan 58
SE-114 50 Stockholm
SWEDEN

Telephone No.:

08-662 08 70

Facsimile No.:

08-663 02 60

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description

☐ as originally filed☐ as amended under Article 34

the claims

☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34

the drawings

☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☒ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (specify) | : | sheets |

For International Preliminary Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

Stockholm, 25 January 2000

Bjerkéns Patentbyrå KB

Stefan Berglund

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No. PCT/SE99/01276	For International Preliminary Examining Authority use only									
Applicant's or agent's file reference PCT 51070 sb/1t	Date stamp of the IPEA									
Applicant <div style="text-align: center; font-size: 1.2em;">Alfa Laval Agri AB et al</div>										
Calculation of prescribed fees										
1. Preliminary examination fee	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">4 200 :-</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-left: 5px;">P</div>									
2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i>	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">1 270 :-</div> <div style="border: 1px solid black; display: inline-block; padding: 2px 5px; margin-left: 5px;">H</div>									
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">SEK 5 470 :-</div>									
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">TOTAL</div>									
Mode of Payment										
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> authorization to charge deposit account with the IPEA (see below) </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> cash </td> </tr> <tr> <td style="vertical-align: top;"> <input checked="" type="checkbox"/> cheque </td> <td style="vertical-align: top;"> <input type="checkbox"/> revenue stamps </td> </tr> <tr> <td style="vertical-align: top;"> <input type="checkbox"/> postal money order </td> <td style="vertical-align: top;"> <input type="checkbox"/> coupons </td> </tr> <tr> <td style="vertical-align: top;"> <input type="checkbox"/> bank draft </td> <td style="vertical-align: top;"> <input type="checkbox"/> other (specify): </td> </tr> </table>			<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash	<input checked="" type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps	<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons	<input type="checkbox"/> bank draft	<input type="checkbox"/> other (specify):
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash									
<input checked="" type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps									
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons									
<input type="checkbox"/> bank draft	<input type="checkbox"/> other (specify):									
Deposit Account Authorization <i>(this mode of payment may not be available at all IPEAs)</i>										
The IPEA/ _____ <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.										
<input type="checkbox"/> <i>(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.										
Deposit Account Number	Date (day/month/year)	Signature								

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) PCT 51070 cg

Box No. I TITLE OF INVENTION

"A device for and a method of detecting a disease of the udder of an animal"

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

Alfa Laval Agri AB
P.O. Box 39
SE-147 21 Tumba
SWEDEN

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

Sweden

State (that is, country) of residence:

Sweden

This person is applicant for the purposes of:

☐ all designated States

☒ all designated States except the United States of America

☐ the United States of America only

☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

NELSON, Lennart
Granbacken 11
SE-147 32 Tumba
SWEDEN

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

Sweden

State (that is, country) of residence:

Sweden

This person is applicant for the purposes of:

☐ all designated States

☐ all designated States except the United States of America

☒ the United States of America only

☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

BJERKENS PATENTBYRÅ KB, represented by
BERGLUND, Stefan; ISRAELSSON, Stefan;
BJERKEN, Håkan; FRÖDERBERG, Oskar; or
OLSSON, Jan;
Östermalmsgatan 58
SE-114 50 Stockholm, SWEDEN

Telephone No.

08 - 662 08 70

Facsimile No.

08 - 663 02 60

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SJAUNJA, Lars Ove
Gnejsvägen 16A
SE-752 42 Uppsala
SWEDEN

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
Sweden

State (that is, country) of residence:
Sweden

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes: at least one must be marked):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

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- | | |
|--|--|
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria and utility model | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic and utility model | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany and utility model | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark and utility model | <input checked="" type="checkbox"/> SD Sudan |
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| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
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| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> YU Yugoslavia |
| | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |
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Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 31/07/1998	9802653-7	Sweden		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY			
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):	
ISA / SE		Date (day/month/year) 19/01/1999	Number SE98/00831
		Country (or regional Office) Sweden	

Box No. VIII CHECK LIST: LANGUAGE OF FILING	
This international application contains the following number of sheets: request : 4 description (excluding sequence listing part) : 8 claims : 3 abstract : 1 drawings : 2 sequence listing part of description : Total number of sheets : 18	This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input type="checkbox"/> separate signed power of attorney 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input checked="" type="checkbox"/> other (specify): ITS-report
Figure of the drawings which should accompany the abstract: Fig 1	Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT	
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).	
Stockholm, 15 July 1999 BJERKENS PATENTBYRÅ KB Stefan Berglund	

For receiving Office use only	
1. Date of actual receipt of the purported international application: 3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application: 4. Date of timely receipt of the required corrections under PCT Article 11(2): 5. International Searching Authority (if two or more are competent): ISA /	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received: 6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

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Date of receipt of the record copy by the International Bureau:	

PCT

FEE CALCULATION SHEET Annex to the Request

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International application No.

Date stamp of the receiving Office

Applicant's or agent's
file reference

PCT 51070 cg

Applicant

Alfa Laval Agri AB et al

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE 1 000:- T

2. SEARCH FEE 6 200:- S

International search to be carried out by

(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

The international application contains 18 sheets.

first 30 sheets 3 500:- b1

x = b2

remaining sheets additional amount

Add amounts entered at b1 and b2 and enter total at B 3 500:- B

Designation Fees

The international application contains 10 designations.

10 x 800:- = 8 000:- D

number of designation fees payable (maximum 10) amount of designation fee

Add amounts entered at B and D and enter total at I 11 500:- I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT (if applicable) P

5. TOTAL FEES PAYABLE 18 700:-

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

TOTAL

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

☐ authorization to charge
deposit account (see below)

☐ bank draft

☐ coupons

☒ cheque

☐ cash

☐ other (specify):

☐ postal money order

☐ revenue stamps

DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)

The RO/ ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☐ (this check-box may be marked only if the conditions for deposit accounts of the receiving Office so permit) is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.

Deposit Account No.

Date (day/month/year)

Signature